

CLAIMS

1. A strapping machine for bundling objects, comprising:
 - a dispenser for feeding a strap from at least one strap coil;
 - an accumulator for receiving the strap from the dispenser and storing excess strap during a tensioning operation;
 - a track assembly extending substantially about a strapping station, the track assembly capable of receiving the strap and then releasing the strap from a plurality of biased covers during a tensioning operation, the covers being biased in a closed position while the strap is guided through a track channel;
 - a feed and tension unit for receiving the strap from the accumulator, for feeding the strap substantially through the strap channel of the track assembly, and for retracting excess strap during the tensioning operation, the feed and tension unit including a plurality of drive and pinch wheels for guiding the strap through a “V-shaped” path;
 - a sealing head assembly located in proximity to the strapping station having a plurality of cams and cam followers mounted on a shaft, the cams being mechanically sequenced for repeatedly and accurately gripping, cutting, and dry sealing the strap around a bundle of objects, the gripping and cutting being accomplished by a cutter-gripper assembly that includes at least one gripper for gripping a free end of the strap and a cutting device for cutting the strap to create two overlapping strap ends; and
 - a main drive assembly having at least one motor for providing power to the feed and tension unit and the sealing head assembly.
2. The strapping machine of claim 1 wherein the strap is a paper web strap that can be successively plow folded and glued into a continuous strip, the strap further being securable around the bundle of objects with the application of heat.

3. The strapping machine of claim 1, further comprising:
a control system having a programmable logic controller for communicating with
at least the sealing head assembly.

4. The strapping machine of claim 1 wherein the dispenser further includes a
spring brake operatively coupled to a mounting shaft, the mounting shaft rotatably supporting a
hub containing an active strap coil, and a strap exhaust switch in communication with the spring
brake for detecting a depleted strap coil.

5. The strapping machine of claim 1 wherein the accumulator includes an
accumulator feed switch to detect the free end of the strap and a spring brake for managing the
feeding of the strap into an accumulator chamber, the accumulator chamber having a bottom
entrance and the chamber being enclosed by a first and second sidewall.

6. The strapping machine of claim 1 wherein the biased covers of the track
assembly are located on independent track sections, each track section having a plurality of guide
supports with a T-shaped interlocking flange projecting radially inward from a track outer frame.

7. The strapping machine of claim 1 wherein each biased cover is rotatably
connected to a backplate and biased in a closed position such that the cover and backplate form a
guide passage for the strap.

8. The strapping machine of claim 1 wherein the feed and tension unit
includes at least one set of wheels adjacently located and biased toward one another for pinching
and asserting a variable force on the strap during a strap feeding operation, the set of wheels
being permitted to rotate freely during other operations.

9. The strapping machine of claim 1 wherein the feed and tension unit
includes at least two independent sets of wheels, each set of wheels one being adjacently located

and biased toward the other wheel in the set, the sets of wheels configured to provide both a primary and a secondary pinching force on the strap, the primary pinch force causes the strap to substantially disengage from the track channel while subsequent secondary pinch force appropriately secures the strap around the bundle of objects.

10. The strapping machine of claim 1 wherein the cutting device includes a cutter blade that is slidably engageable with a press platen and the blade being biased in a non-cutting position with a cutter spring that is compressed between the cutter blade and the press platen.

11. The strapping machine of claim 1 wherein the cutting device is configured to be reversibly installable such that either end of the cutting device may be used for cutting the strap.

12. The strapping machine of claim 11, further comprising:
a first cutting edge of the cutting device is configured with a proximal corner end and a distal corner end, the proximal corner end being vertically offset relative to the distal corner end by approximately 9 degrees, an opposing second cutting edge of cutting device configured to symmetrically mirror the first cutting edge.

13. The strapping machine of claim 1 wherein a variable force is applied to the strap by altering the pulse width modulation of a feed pinch solenoid.

14. The strapping machine of claim 1 wherein the track assembly has at least one indicator light attached thereto to provide an indication of a strap misfeed condition.

15. A method for applying an adhesive-coated strap around a bundle of objects comprising the steps of:

guiding the strap around the bundle of objects;

securing the strap about the bundle of objects;
gripping at least one end of the strap to maintain tension in the strap during a bundling operation;
cutting the strap to produce two overlapping strap ends;
inserting a heater blade between the overlapping strap ends;
dry sealing the overlapping strap ends through a mechanically timed dwell means while pressing the strap ends against the heater blade, the heater blade being in contact with the bonding surfaces of the strap;
removing the heater blade;
pressing the adhesive-coated portions of the strap ends together;
applying pressure to the sealed strap to cure and cool the adhesive; and
releasing the strap to produce a strapped bundle of objects.

16. The method of claim 15 wherein dry sealing includes the application of heat to the overlapping strap ends without being augmented by the application of a liquid.

17. The method of claim 15 wherein dry sealing the overlapping strap ends through a mechanical dwell means includes actuating a plurality of cams through a cycloidal sequence.

18. A strapping machine for bundling objects, comprising:
a first means for dispensing a strap from at least one strap coil;
a second means for receiving the strap from the first means during a strap feeding operation and for accumulating excess strap during a tensioning operation;
a third means for releasably retaining the strap around a bundle of objects and subsequently releasing the strap through a plurality of biased covers during the tensioning operation;
a fourth means for receiving the strap from the second means and applying a sufficient force to the strap to direct the strap around the bundle of objects as defined by the third

means, the fourth means further configured to retract excess strap during the tensioning operation;

a fifth means for mechanically controlling the gripping, cutting, and dry sealing of the strap once the strap is sufficiently located about the bundle of objects, the fifth means defining where the strap enters and exits the third means; and

a sixth means for providing power to at least some of the major components of the machine.